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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/998,040

11/30/2001

Ronald Lee Watts

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10/05/2004

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EXAMINER

GARBER, CHARLES D

ART UNIT

PAPER NUMBER

2856

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/998,040

Applicant(s)

WATTS ET AL.

Examiner

Charles D. Garber

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,9,11-14,22-28 and 30 is/are rejected.
- 7) ☒ Claim(s) 3,5-8,10,15-21 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 9, 11, 12, 14, 23, 26 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. (US Patent 6,446,517) in view of Material Bulletin, "PIT Environmental Test Method" IBM (from Applicant's IDS, henceforth referred to as "IBM Material Bulletin").

Regarding claims 1 and 11, Sharma discloses testing disk drives including at least one drive 20 shown in figure 1 positioned for testing. The drive may have a filter to prevent contamination and is therefore considered otherwise sealed. Disk drives inherently have cavities. Particle chamber 12 is an impurity chamber inherently at a first pressure and containing thousands of dispersed gas-borne particles.

Sharma also discloses testing plural prototypes which is considered a multiplicity.

Sharma lacks maintaining a pressure of the cavity at a second pressure lower than the first pressure.

IBM Material Bulletin teaches products which may be susceptible to damage from dust may be tested as shown in figure 2. The product interior is connected to a blower and filter which produce a small vacuum in order to produce a positive flow from the dust laden test chamber through any openings that may exist (paragraph 8.3)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce a small vacuum in order to increase the chances of detecting undesired openings in the product housing.

Sharma exposes the device exterior to the impurity chamber (abstract) and evaluates the device based on performance but not expressly upon an indication of whether the particles present in the selected device at an amount exceeding a predetermined threshold.

IBM Material Bulletin also teaches establishing recommended acceptance criteria in terms of a threshold amount of dust in $\mu\text{g}/\text{m}^2$ (paragraph 11 and table 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to ensure an acceptable failure rate is not surpassed.

Sharma does not expressly recite the "particles each contain a marker impurity that is substantially absent from all of the interior surfaces of the selected device".

However, Applicant's specification on page 5 explains "any material not used in manufacturing components of the device should be assumed to meet this condition".

Sharma discloses test "contaminants 26 may be compositionally identical to dust

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particles typically found in the working environment of a hard disk drive", the environment being an external environment. Examiner considers that such dust particles implied by Sharma are not of material used in the construction of the disk drive.

As for claim 9, the references disclose the claimed invention except for the first pressure is at least 5 psi higher than the second pressure. It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce a 5 psi pressure differential, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In this case the result effective variable is a pressure differential that will more effectively expose seal leaks of a size that will permit excessive dust inside.

A for claim 12, the references disclose the claimed invention except for sustaining the period for at least one day. It would have been obvious to one having ordinary skill in the art at the time the invention was made to sustain the period for at least one day, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As for claim 14, as discussed above with respect to claim 1 the references taught evaluating the units with respect to acceptance criteria. This implies failing the others if the amount of impurity exceeds the threshold. Though the threshold amount is not effectively zero Examiner considers it would have been obvious to one having ordinary

skill in the art at the time the invention was made for the amount to be effectively zero, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As for claim 23, IBM Material Bulletin teaches acceptance criteria based on acceptable particle concentration which is further based on a level that will degrade performance in terms of inducing failure of the product.

Regarding claim 26, Sharma discloses testing disk drives including at least one drive 20 shown in figure 1 positioned for testing. The drive may have a filter to prevent contamination and is therefore considered otherwise sealed. Disk drives inherently have cavities. Particle chamber 12 is an impurity chamber inherently at a first pressure and containing thousands of dispersed gas-borne particles.

Sharma also discloses testing plural prototypes which is considered a multiplicity.

Sharma exposes the device exterior to the impurity chamber (abstract) and evaluates the device based on performance during a test using tester 44 but not expressly using the marker impurity.

IBM Material Bulletin also teaches monitoring the accumulation of dust at points of interest within the product (paragraph 8.7). This information is used in establishing recommended acceptance criteria in terms of a threshold amount of dust in $\mu\text{g}/\text{m}^2$ (paragraph 11 and table 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the accumulation of dust within the product so that it may be

related to product failure in order establish an acceptance criteria based on dust accumulation.

As for claim 30, as discussed above, IBM taught the advantage of evaluating the dust level within the product after testing in order to derive a relationship between dust level and device life till failure.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. (US Patent 6,446,517) as modified by Material Bulletin, "PIT Environmental Test Method" IBM (from Applicant's IDS, henceforth referred to as "IBM Material Bulletin") and applied to claim 1 above and further in view of Ogino (US Patent 5,109,380).

Regarding claim 2, the references lack the selecting step (a) comprises steps of: (a1) leak-testing at least some of the multiplicity of data handling devices; and (a2) finalizing the selection step (a) by selecting the at least one device based on an outcome of the leak-testing step (a1).

Ogino discloses test apparatus and methods for conducting Failure Mode and Effects Analysis (FMEA) of sealed electronic subsystems such as those used in satellites where high reliability is demanded.

Ogino teaches "it is necessary to ... conduct leakage tests before ... an environmental test" in which dust may clog a part.

It would have been obvious to one having ordinary skill in the art at the time the invention was made in order to screen out parts that are likely to fail from environmental testing.

Claims 4 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. (US Patent 6,446,517) as modified by Material Bulletin, "PIT Environmental Test Method" IBM (from Applicant's IDS, henceforth referred to as "IBM Material Bulletin") and applied to claim 1 and 26 above and further in view of O'Holleran (US Patent 4,744,919).

Regarding claims 4 and 27, the fans 30 and 32 will agitate the contaminant to disperse the it into the gas atmosphere of the chamber. However the references do not expressly teach providing a mixture comprising the marker impurity and a carrier impurity

O'Holleran teaches doping a natural mineral clay carrier with rare earth elements to form tracer particles (Abstract, Background of the Invention, Objects and Summary of the Invention). Such a mixture is superior gaseous tracers as well as "particulate tracers such as oil fog, smoke and die particles" which "all have drawbacks."

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a tracer material with a carrier to form tracer particles as this is advantageous over other particles such as oil fog, smoke and die particles that have drawbacks.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. (US Patent 6,446,517) as modified by Material Bulletin, "PIT Environmental Test Method" IBM (from Applicant's IDS, henceforth referred to as "IBM Material Bulletin") and applied to claim 1 above and further in view of Retta et al. (US Patent 5,138,871)

Regarding claim 22, the reference lack the evaluating step (d) includes a step (d1) of analyzing the chemical content of a media defect with a spectrum analyzer to verify that the defect contains some of the marker impurity.

Retta discloses a leak testing method teaching the use of fluorescent particles which are detectable during test. "The presence of fluorescent microspheres will result in a characteristic waveform... which is distinguishable from the background waveform"

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use spectral analysis, as this is effective in distinguishing detectable particles from background in a leak test.

Claims 13 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. (US Patent 6,446,517) as modified by Material Bulletin, "PIT Environmental Test Method" IBM (from Applicant's IDS, henceforth referred to as "IBM Material Bulletin") and applied to claim 1 above and further in view of MIL-STD-810E Method 510.3 "Sand and Dust" henceforth referred to at "Method 510.3".

Regarding claim 13, the reference do not expressly recite the cavity is a localized portion of a device housing interior bounded by the interior surfaces, and in which the exposing step (c) includes a step (c1) of operating the selected data handling device(s) so that the localized portion is partially evacuated. However, Method 510.3 teaches operating devices under blowing dust in order to evaluate performance degradation over time. Furthermore, Examiner considers the operation of the device 20 of Sharma will inherently create localized areas of low pressure due to the spinning disk.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to operate the disk of Sharma during a dust test as taught by Method 510.3 in order of evaluate the its performance as a function of time and thereby predict its future performance in dust laden environments.

Claim 28 is considered to be substantively the same as claim 13. Any seal may be considered to be imperfect in some respects.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. (US Patent 6,446,517) as modified by Material Bulletin, "PIT Environmental Test Method" IBM (from Applicant's IDS, henceforth referred to as "IBM Material Bulletin") and applied to claim 1 above and further in view of Pederson (US Patent 5,109,304).

Regarding claim 24, Sharma discloses testing the drive 20 with a tester 44 during dust testing (column 2 lines 47-49, column 2 line 65 to column 3 line 1) but not expressly based on monitoring an average bit error rate (BER) to determine whether a significant BER change occurs as in the instant invention.

Pederson teaches "Typical testing of a disk drive serves to detect whether the bit error rate (which may be due, in part, to bit shifting) is within preset limits. If not, the disk drive, or at least certain tracks or sectors, is determined to be defective."

It would have been obvious to one having ordinary skill in the art at the time the invention was made to test to determine changes in BER outside of preset limits because this is a typical method of determining if disk drives are defective.

As for claim 25, references disclose the claimed invention except for the acceptable limit being 3% growth in BER. It would have been obvious to one having

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ordinary skill in the art at the time the invention was made to determine an acceptable limit of 3% growth in BER, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

Claims 3, 5-8, 10, 15-21 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, the step is directed towards identifying devices for inclusion for test whereas the Ogino reference appears directed towards identifying devices for exclusion from testing. Modifying the combination with Ogino to read upon claim 3 would essentially render Ogino ineffective.

As for claim 5, the prior art does not disclose or suggest further providing a marker impurity of diamond dust and including a step of mixing a mass M of diamond dust with a larger mass $> 9M$ of talc as in the instant invention.

As for claim 6, the prior art does not disclose or suggest the multiplicity of data handling devices can each store data in thousands of tracks written therein, the tracks having a median width W, a subset of the thousands of particles each having a length greater than W, at least 5 % of the particles in the subset having a length less than 10W

so as to reduce an amount of the marker impurity needed to perform the evaluating step (d) effectively as in the instant invention.

As for claim 7, while Examiner considers the disk drive of Sharma can each store data in thousands of tracks written therein, the tracks having a median width W , the reference do not disclose or suggest a subset of the thousands of particles each having a length greater than W , at least 5% of the particles in the subset having a length less than $10W$ so as to reduce an amount of the marker impurity needed to perform the evaluating step (d) effectively as in the instant invention.

Claim 8 depending from allowable claim 7 is allowable for the same reason.

Claim 10 is allowable for substantially the same reason as claim 3.

As for claim 15 and 16, the prior art does not disclose or suggest the marker impurity provided in the providing step (b) is at least 10% harder than a data storage media surface inside the sealed chamber, and in which the exposing step (c) results in a portion of the marker impurity being deposited into the data storage media surface as in the instant invention.

As for claim 17, the prior art does not teach the marker impurity provided in the providing step(b) is at least 10% softer than a data storage media surface inside the sealed chamber, and in which the exposing step (c) results in a portion of the marker impurity being deposited onto the data storage media surface as in the instant invention.

Claims 18-20 depending from allowable claim 17 are allowable for the same reason.

As for claim 21 and 29, the prior art does not disclose or suggest the marker impurity provided in the providing step (b) is selected so as to be harder than a data storage surface of the tested device so that one of the airborne particles can damage and become lodged into the data storage surface as in the instant invention.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The additional references cited on the accompanying form PTO-892 though not cited above are provided to indicate other prior art dust test methods and apparatus which include one or more features or limitations in common with the instant invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles D. Garber whose telephone number is (571) 272-2194. The examiner can normally be reached on 6:30 a.m. to 3:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cdg

A handwritten signature in black ink, appearing to be 'CDL' with a stylized flourish at the end.